

should explain that single-LATA states are those that are served by a single LATA, whether or not the LATA is coextensive with the state's borders. Any other interpretation would deny the benefits of intraLATA toll competition to consumers in single-LATA states. Absent a Commission statement, consumers in some states (like Delaware) will have only one choice for intraLATA toll on a 1+ basis until the RBOC is granted in-region authority, or until 1999.

5. COST RECOVERY FOR PERMANENT LOCAL NUMBER PORTABILITY (CC DOCKET 95-116)

The Act requires that the costs associated with permanent local number portability (LNP) be borne by all carriers on a competitively neutral basis. Cost recovery looms as a potentially enormous financial burden for new entrants, particularly if we were asked to finance our own local number portability development, and compensate the incumbents for their development at the same time. The FCC should rule that pooling and mandatory end user surcharges are not in the public interest and are not acceptable cost recovery methods. The FCC should rule that LNP costs should be borne by the incumbents because placing costs on new entrants loads additional costs onto interexchange carriers (IXCs), which benefit only indirectly from LNP, and are already spending significant sums to become LNP-capable. The FCC should also require the incumbents to quantify the figures used to support their arguments that LNP costs are extremely high, thus exposing those that are clearly padding their estimates in an attempt to recover non-LNP related costs.

6. NXX LOADING ISSUES

MCI discovered that several of its customers were not receiving telephone calls placed to them in California because PacBell's systems do not recognize MCI local customers' phone numbers. Unable to route the calls to MCI's customers, PacBell undertook a manual process several weeks ago to complete the input process. Thus far, the process has been arduously slow -- one telephone number at a time. Pacific Bell claims to be working on a system that will allow it to validate that telephone numbers are loaded into its system, but that system apparently will not be operational until September. In the meantime, MCI local customers run the risk of not receiving their telephone calls. MCI has encountered these difficulties in many parts of the country, but they have been particularly acute and remain unresolved in the PacBell region.⁶

The Commission should therefore promptly direct incumbent LECs to activate NXX codes in accordance with the schedule described in the Industry Numbering Committee's Central Office Code Assignment Guidelines or, at a minimum, to activate the NXX codes assigned to other entities no less promptly than they activate NXX codes assigned to themselves. The

⁶ On May 28, MCI filed a request at the FCC for clarification of local telephone companies' obligations for NXX code activation and verification for updating their systems with MCI's and other CLECs' customers' telephone numbers.

Commission should also confirm the requirement that incumbent LECs must provide auditable verification of the activation of other entities' assigned NXX codes. NXX code activation is competitively significant for several reasons, including the fact that it is impossible to reach the another carrier's customers using regular dialing from a switch in which that entity's NXX codes have not been activated. It is very difficult to sell local service to a customer who, upon switching providers, will be unable to receive telephone calls.

7. SHARED/COMMON TRANSPORT (CC Docket No. 96-98)

On reconsideration, the Commission should clarify that ILECs are required to unbundle common (shared) transport and provide it at TELRIC-based, per-minute rates. The Commission should confirm that ILECs are required to unbundle local transport, including access to shared transmission facilities between ILEC end offices and tandem switches, and to dedicated facilities between ILEC central offices and those of competing carriers. This would be more efficient than having new entrants either duplicate the ILEC's network by constructing their own interoffice facilities, which would delay entry and significantly increase new entrants' costs, or by purchasing costly dedicated transport.

8. EXPEDITIOUS COMPLETION OF ALL PENDING ENFORCEMENT ACTIONS

Enforcement presents one of the most critical means by which the Commission can ensure the development of a competitive local market place. MCI and other CLECs have encountered ILEC actions that have served to impede their ability to compete effectively as a local and long distance provider. MCI believes that ILECs have relied on the fact that historically, regulatory agencies have taken significant time to render decisions. While our recent enforcement efforts at the Commission are subject to expedited briefing schedules, the Commission must not lose sight of the need for expedited decision-making.

The Commission has the opportunity through its pending formal complaint rulemaking proceeding to dramatically reform its enforcement procedures in order to make them more efficient and ultimately, more effective. New entrants need enforcement processes that replicate the incentives of the emerging competitive marketplace. Indeed, the Commission must be willing to try to new and creative ideas and techniques to discourage incumbent anti-competitive actions. For example, the Commission should adopt a "quick look" process that seeks to discern whether service is working. A party would have the ability to pursue actions to assess liability and sanctions/fines/penalties immediately after the problem is fixed. This would ensure that no permanent advantage accrues to any competitor from a lack of regulatory initiative, that the action is timely and that the Commission is able to replace the incentives that competition would provide. Without this type of swift and decisive action, the ILECs will only be encouraged to continue to undertake unlawful and anti-competitive actions in order to protect their current monopoly environments to the detriment of consumers.

9. PENDING PETITIONS FOR DECLARATORY RULING AND/OR PREEMPTION

While ILEC actions have been used to create barriers to entry for new entrants, there are many instances where state and/or local actions have impeded a new entrant's ability to enter the local market as well. Therefore, the Commission must resolve each pending petition for declaratory ruling or preemption of conflicting state or local action. Resolution of preemption petitions filed by new entrants would quickly remove barriers to entry erected by state and local governments that clearly contravene federal telecommunications policies. These petitions include, but are not limited to:

- Petition seeking declaratory ruling and/or preemption of the Texas Public Utility Regulatory Act of 1995 which among other things, requires new entrants to construct new network facilities as a condition of certification to provide local services. (CCBPol 96-14)
- Petition seeking preemption of certain provisions of the Arkansas Telecommunications Regulatory Reform Act of 1997 as violating section 253 of the Act and requesting that the Commission assert jurisdiction over state arbitrations pursuant to section 252(e)(5) of the Act. (CC Docket No. 97-100)
- Petition seeking declaratory ruling that Troy, Michigan's use of its permitting processes, its control over cable franchising and its local telecommunications ordinance are preempted and are in violation of sections 541, 544(e) and 253 of the Act. (CSR-4790)
- Petition seeking declaratory ruling that any requirement imposed by an ILEC or state or local government that a new entrant obtain separate right-to-use and license agreements before a new entrant may purchase access to unbundled elements violates sections 251 and 253 of the Act, and that the Act's nondiscrimination requirement requires an ILEC to provide the requesting carrier with the same rights to intellectual property that the ILEC enjoys. (Docket No. CCBPol 97-4; CC Docket No. 96-98)
- Petition for declaratory ruling that where there are significant geographic differences in the cost of providing interconnection or unbundled elements, rates for interconnection and unbundled elements that are not geographically deaveraged constitute a barrier to entry and the failure to geographically deaverage is a violation of section 252 of the Act. (Docket No. CCB/CPD 97-1)
- Petition seeking declaratory ruling and contingent preemption of the initial costs incurred by ILECs to meet the statutory requirements of the Act (such as US West's Interconnection Cost Adjustment Mechanism surcharges) are not recoverable through state imposed surcharges on either the CLEC or the end user. (CC Docket No. 97-90; CCB/CPD 97-12)
- Request for clarification of the Commission's rules regarding reciprocal compensation for

information service providers. (CCB/CPD 97-30)

- Petition requesting that the Commission affirm its decision that the recombination of unbundled elements to provide a service already being provided by the ILEC does not constitute a resold service.

In addition, the Commission should establish procedures that allow it to proceed even more quickly on future petitions. For example, MCI may soon file a petition asking the Commission to conclude that a state has failed to fulfill its obligation to conclude arbitrations. If that petition is filed, MCI will request that the Commission act even more quickly than the Act requires.

ELIMINATING THREATS TO A COMPETITIVE LONG-DISTANCE MARKET

Although our determination and commitment to provide consumers with choice, lower prices and better quality local telephone service remain strong, our efforts to do so have been frustrated by ILEC strategic and anti-competitive behavior. Moreover, MCI has become keenly aware that its relationship with the RBOCs as a long distance provider has begun to deteriorate as well. We are convinced that the increased anti-competitive actions can be directly attributed to the RBOCs' interest in obtaining in-region long distance authority. Thus, it is imperative that the Commission recognize the need for resolution of more than local service issues. In the end, if MCI's long distance business becomes compromised financially because of regulatory inaction with respect to RBOC actions, the monies necessary for additional investment in the provision of local service will also be jeopardized.

1. PAYPHONE REMAND (CC Docket No. 96-128)

The Commission must act immediately to eliminate the current interim compensation mechanism and revise its compensation scheme immediately to base compensation for 800 and access code calls on the cost of providing service. Compensation based on cost would fairly compensate payphone providers and, thus, enable them to maintain and expand service, while allowing carriers to keep operator service and 800 rates affordable to consumers.

If an immediate decision on cost-based compensation is not forthcoming, the Commission should at minimum act to discontinue payments under the unlawful interim compensation scheme that was overturned last week, and to initiate a two-way true up mechanism that protects all parties once a compensation decision is reached.

2. BILLING AND COLLECTION

Currently, most customers receive one bill that contains their local and long distance charges. Incumbents, however, have altered or are threatening to alter their business relationships with long distance providers by eliminating billing and collection services or

increasing prices by an unjustifiable amount. The Commission needs to take two actions. First, with respect to casual billing, the Commission must implement rules requiring all LECs to provide billing and collection for non-subscribed services on a non-discriminatory basis, pursuant to an MCI rulemaking request currently pending before the Commission. Unless this occurs, MCI will be unable to bill effectively and economically for these services, which provide consumers with services they value and use. Non-subscribed services accounted for \$11.6 billion in revenue industry-wide in 1996; 10XXX for non-big three in 1996 accounted for \$1.5 billion. Unless the Commission acts, there will be a reduction in competition and consumer benefits provided through non-subscribed services. Many non-subscribed service providers would be driven out of business and/or have to discontinue certain services due to increased bad debt.

Second, the Commission should examine carefully ILEC provision of billing and collection to unaffiliated and affiliated long distance carriers to ensure that billing and collection is provided on a reasonable and nondiscriminatory basis. It should also examine, whether in light of local competition, billing and collection requirements should be imposed on all ILECs. In addition, the Commission must examine the lack of alternative suppliers of billing and collection, and whether ILEC provision of billing name and address data at prevailing interstate access rates is cost-based, providing an adequate opportunity for long distance providers to provide their own billing and collection services as an alternative to ILEC billing.

3. CARRIER IDENTIFICATION CODES (CICs) (CC DOCKET 92-237)

In April, the Commission ordered that all 3-digit CICs be retired on January 1, 1998, in order to accommodate the industry's growing need for CICs and to accommodate a perceived shortage of CICs. But this January 1, 1998, flash cut from 3- to 4-digit CICs is an expensive solution in search of a problem. Bellcore data shows that there is no shortage of CICs that justifies this early transition date. Unless the Commission extends the transition date, long distance consumers seeking to dial around (such as when a presubscribed carrier suffers a network outage) are going to face a new dialing disparity that will undoubtedly cause confusion and customer complaints, even if companies such as MCI are forced to spend millions to educate consumers about the new dialing patterns. Dialing confusion also adversely affects competition for intraLATA toll services. Since RBOCs are generally not required to provide presubscription until they receive section 271 authorization, MCI is at a severe competitive disadvantage if the January 1, 1998, deadline remains, since most confused consumers will find it more convenient to place toll calls by simply dialing 1+. As supported by pending petitions from several CIC holders, the Commission should not retire 3-digit CICs on January 1, 1998, and should extend the permissive dialing period for 3- and 4-digit CICs through at least the year 2000.

4. REQUIRE LECs TO DELIVER FULL REDUCTION ON ACCESS CHARGES (CC Docket No. 97-107)

The Commission should conclude its investigation of the price cap ILECs' 1997 annual

access tariffs by the end of July 1997. The Common Carrier Bureau has already found that the ILECs' tariffs raise substantial questions of lawfulness. By concluding the investigation and requiring the ILECs to comply with the price cap rules, the Commission would close the \$200 million gap between the access charge reductions filed by the ILECs and the Commission's \$1.7 billion announced reduction.

5. ADMINISTRATION OF THE NORTH AMERICAN NUMBERING PLAN (NANP)
(CC DOCKET 92-237)

The Commission should quickly select Lockheed Martin as the new NANP administrator, based on North American Numbering Council's recommendation that it do so. If Mitretek, the second place bidder, is selected, it would cost the industry an additional \$22.5 million to support NANP administration by Mitretek, as compared to Lockheed Martin. Additionally, transition from the present system, devised under a monopoly model, to a neutral numbering administration system, needs to be concluded as expeditiously as possible. Until then, new entrants are required to secure essential numbering needs by relying on the RBOCs and ILECs, our direct competitors.

6. PIC FREEZE PETITION (CCB/CPD 97-19, RM 9085)

The Commission must implement a rulemaking proceeding now and adopt the rules proposed by MCI to ensure that carrier practices in soliciting, implementing and removing PIC freezes do not impede competition. ILECs are using PIC freezes to lock in their own customers and to impede effective competition, particularly in the local and intraLATA toll markets. MCI's proposed rules would ensure that PIC freezes are not used to frustrate intraLATA toll and local competition before it has a chance to develop.

CONCLUSION

We understand that MCI has put forth a daunting agenda of Commission action. And, of course, this letter has not detailed the many, equally important, actions that must be taken by state regulators, antitrust officials and the courts. But this agenda is no more daunting than the competitive strategy that MCI has undertaken. We are going into battle against an entrenched, well-heeled, and sophisticated opponent. We do not ask that those competitors be disarmed. We merely ask, on behalf of consumers and businesses, that our opponents not be permitted to protect themselves from battle by wielding the unfair shield of monopoly.

As this letter demonstrates, monopoly power cannot be eliminated with a single stroke (of the metaphorical sword or the legislative pen). That is why the Federal Communications Commission was given the power to turn the language of the Telecommunications Act into true competitive opportunity. To fulfill this task necessitates that a great number of tasks be accomplished, with scarce resources and in a short time. This is an aggressive, but eminently reasonable, approach. Without the execution of this pro-competition agenda the purpose of the Telecommunications Act will remain unfulfilled.

Sincerely,



Jonathan Sallet
Chief Policy Counsel

cc: Commissioner James H. Quello
Commissioner Susan Ness
Commissioner Rachelle B. Chong
Thomas Boasberg
Paul Gallant
James Casserly
Dan Gonzalez
Regina Keeney
Richard Metzger
William Kennard
John Nakahata

Attachment 3

Compendium of Cites Pertaining to Forward Looking Costs of Electric Construction, Installation, and Maintenance

At Home With Telecommunications

by Leslie Lamarre

THE STORY IN BRIEF

Forget the cable company, the phone company, and other big hitters in telecommunications. Electric utilities want to be the ones to deliver new and tantalizing information services to consumers. Faced with impending competition and armed with an investment in telecommunications technologies that already rivals that of the communications industry, electric utilities across the country are exploiting the impressive capabilities of these technologies to provide advanced services to their customers. And many are targeting the residential market. Time-of-use pricing and appliance control are already saving consumers money on their electric bills while shaving utility costs and securing a more intimate customer link that is critical in a competitive environment. Home security, on-line bill payment, and remote diagnostics are just some of the other capabilities in the works. Whether they are expanding their existing communications infrastructures, leasing space on these networks to other telecommunications providers, or teaming up with partners to deliver the goods, these utilities are serious about bringing telecommunications home.

The mercury hovers around 110°F in the dusty border town of Laredo, Texas, as Rene Rodriguez makes his way home after a long day of work one September evening. But he knows his home will be cooled to 77°F when he steps through the front door. And he knows he isn't paying extra money for this comfort. In fact, Rodriguez—who can program his air conditioner and other big appliances to coincide with his electric utility's high, medium, and low rates for the day—estimates he is saving about \$40 a month on his electric bill. If he decides to change the programmed settings, he simply plugs a slick-looking console into the wall and punches a few keys.

Across the country in Walnut Creek, California, the Grimes family is absorbed in the evening news when a report on the current heat wave reminds them of their electricity use. With the touch of a button on a special remote control device, a status bar appears at the bottom of their television screen showing Steve and Stella Grimes how much electricity major appliances like the air conditioner and refrigerator are using. They can also program their porch lights to come on and go off at desired times of the day—all without missing a beat of Dan Rather.

These are just two examples of the many ways in which electric utilities are using advanced telecommunications technologies to offer more conveniences to their customers. Gearing up for full-fledged competition among power companies, the utilities involved in these efforts believe the new services that telecommunications enable might help them retain existing customers and maybe even snag new ones. Whether the utility-customer connection uses telephone wires, fiber-optic lines, coaxial cables,

radio waves, utility distribution lines, or some combination of these channels, the capability for two-way communications is becoming increasingly important. And the time-of-use pricing and appliance control options that are saving Rene Rodriguez money on his electric bill are just the start. Remote appliance diagnostics, home security service, and on-line bill payment are among the vast array of other advanced capabilities utilities are exploring.

These services are not intended to benefit only the customer; they have built-in benefits for the utility as well. For instance, time-of-use pricing--through which rates vary during the day to more accurately reflect the actual cost of generating and delivering power at a given time--encourages customers to shift energy use away from periods of peak demand. The result is lower power bills for the customer, which can give the utility a competitive edge. Remote meter reading, meter-tampering detection (which accounts for as much as 1% of utility revenues), instant information on the time and location of power outages, remote connection and disconnection of customers, and information about electricity consumption patterns are just some of the business advantages. In addition, such services enable utilities to get closer to their customers at a time when building customer loyalty is critical.

"Just as the telecommunications field is undergoing a virtual explosion in innovation and information transfer capabilities, electric power companies are reaching a competitive phase in which they are finding that these technologies might very well help them distinguish themselves from all the other power providers out there," says Steve Drenker, manager of EPRI's Information Systems & Telecommunications Business Unit. "Telecommunications is an exciting tool that utilities can use to get an edge in the market."

There are other reasons for electric utility involvement in telecommunications. Over the years, power companies have built up extensive infrastructures of telephone wire, fiber-optic cable, radio links, and other communications channels--mainly to meet their own internal communications needs. In fact, the electric utility industry ranks second only to the communications industry itself in its use of telecommunications media. What's more, utilities typically use only about 3% of the capacity of these elaborate communications webs for their own purposes. As one utility executive puts it, "We're sitting on a gold mine."

The fact that power companies already have access to virtually every home and business in the country offers added incentive for utilities to pursue the telecommunications market. And that's exactly what many are doing--in a variety of ways. Some are opting to expand their communications infrastructures to offer advanced energy management and other capabilities directly to their customers. Others are leasing available space on their networks and letting other companies deliver the goods. Still others are teaming up with telephone and cable television firms that are vying for the same customers. Some power companies are even investing directly in the development of related hardware and software technologies for both wired and wireless applications.

The telecommunications reform bill that President Clinton signed in February 1996 makes it easier for electric utilities to compete with phone companies, cable firms, and other service providers vying for a piece of the market. Among other changes, the bill removes state and local prohibitions against utility involvement in telecommunications, protects utilities' internal communications systems, and allows utility holding companies to diversify into telecommunications.

Taking control

One holding company that wasted no time on this front is Central and South West Corporation, which filed to become a telecommunications provider within hours of Clinton's signing of the bill. As a result, its

subsidiary CSW Communications became the country's first so-called exempt telecommunications company. (There are now 12 such companies, according to the trade group called UTC: The Telecommunications Association.) Among CSW Communications' first efforts is the pilot program that is providing the Rodriguez family and 800 others in Laredo a glimpse of what may be the future of customer service in the power business.

Through a handheld console manufactured by Raytheon, these CSW customers can control up to five big electricity loads in their homes. For Rene Rodriguez, who has a two-story, 3200-square-foot house, the choice was obvious. He picked the two air conditioners, the two water heaters, and the clothes dryer. He says it took about half an hour with a utility representative to learn how to use the console to program the appliances. Now, these big energy users are most active when electricity rates are lowest. In fact, Rodriguez has programmed the water heaters and the dryer to shut down completely during both the high-rate and medium-rate periods. Like the other program participants, Rodriguez can read his month-to-date electric bill through the console. And he has programmed his system to turn off major appliances when it receives a price signal from his utility during very high rate emergency periods. Rodriguez says his electric bill, which averaged \$150 a month before the program, has remained about the same—despite the addition of a baby and a live-in maid. He suspects it would have gone up to about \$190 a month.

Kicked off last April, the Laredo program depends on an infrastructure of fiber-optic line and coaxial cable. Electronic sensors that CSW installed on the major appliances enable the consumers to track how much energy each appliance is using. The pilot will continue indefinitely. "Our customers seem to appreciate it," says Don Shahan, president of CSW Communications. "They are saving money and they are responding to our price tiers." On average, the participants are shifting 2 kW per household off-peak between 4 and 5 p.m. and saving 10% on their electric bills.

The Laredo project has received a lot of attention, in part because it is among the largest programs of its kind ever undertaken. CSW Communications has since won a contract with the city-owned electric utility in Austin, Texas, to develop and test a wireless system in a 19-month pilot program to be kicked off later this year. Also, CSW has been awarded a seven-year franchise to build a fiber-optic network that will ultimately reach into every home and business in Austin, a city of 544,000 people. The company hopes to provide energy management services over the network and to lease capacity on the system to other firms that would provide services ranging from high-speed Internet access and telemedicine to videoconferencing and home security. "One of the driving forces behind the Laredo project was looking down the road and seeing deregulation and competition coming," says Shahan. "We want to get a stronger hook into our customers and provide them with something that other potential suppliers of electricity do not have."

Other utilities, such as Boston Edison, are following suit. Last September, this utility announced that it has teamed up with RCN Inc.—a provider of integrated voice, data, video, and high-speed Internet services—to build an interactive data network for homes in 40 cities and towns in the greater Boston area. The backbone of the project is a 200-mile ring of fiberoptic cable that the utility has already established for its own communications. According to the utility, this is more fiber-optic cable than is owned by any other electric utility in the state and more than is owned by most telecommunications companies.

Boston Edison and RCN have agreed to invest about \$300 million in enhancing the network over the next five years so that it can be used to deliver video, telephone, energy management, and other services to 650,000 customers. Mike Monahan, a spokesman for the utility, notes that local telephone and video services are likely to be among the first services deployed on the network, with energy management introduced later in the five-year time frame. He says the joint venture will be in direct competition with

the local telephone company, New England Bell, as well as cable providers and Internet access companies.

Utility presence

Electric utilities grappling with the telecommunications challenge are trying to determine what form the customer interface should take. From the utility's perspective, this is a critical issue, for it is symbolic of the transition of the utility presence from an exterior wall of the home, where it is relegated to a decidedly user-unfriendly electric meter, to inside the home, where it will reside in a sophisticated interactive device. This interface will be the key point of contact with the customer for delivering a variety of services that are likely to extend far beyond basic energy management into home automation, text message paging, electronic mail, and—depending on the sophistication of the interface—interactive entertainment. "Electric utilities have a real market opportunity to become the providers of choice for bundled communications services," says David Cain of EPRI, manager of new business development in the Information Systems & Telecommunications Business Unit. "This is an opportunity that many are having a hard time passing up."

At this stage, power companies are considering a variety of forms for this interface, from an elaborate version of the thermostat to a television screen, a PC, or a telephone with a small screen that can be used to deliver a wide range of interactive services.

Southern California Edison is among the few utilities that are currently experimenting with the screen phone interface. At this writing, the utility is nearly finished developing energy management applications for the P100 screen phone manufactured by Philips, which offers a host of other features, such as Internet access, electronic mail, and electronic shopping and banking (a magnetic strip reader enables credit card and bank card transactions). With the energy management functions, users will be able to monitor their electricity use to date and see how much energy their biggest appliances are consuming. The system is expected to be tested in the homes of SCE employees early this year. "I think one of the reasons utilities are hesitant to rely on a screen phone interface is that they are not sure how this new type of telephone is going to get into the home," says Dukku Lee, SCE's project engineer. "Consumers are not accustomed to buying telephones to carry out these kinds of transactions. But we feel that the right blend of services will attract a wide range of customers."

Some utilities are experimenting with a combination of approaches. For instance, Pacific Gas and Electric, which sponsors the program that enables the Grimes family and 49 other customers in Walnut Creek, California, to monitor and control their energy use through their television screens, is about to switch to a PC interface. For the initial 50-home project—a collaboration with TeleCommunications Inc. (TCI), the world's largest cable television operator, and software giant Microsoft Corporation—the existing cable infrastructure had to be upgraded to a hybrid fiber-coax network. With the help of a digital set-top box and Microsoft's "point and click" operating system, users can program certain appliances to run at specific times.

The second phase of the project, which is expected to get under way in April, will rely on a telephone connection to the Internet as an avenue for communication, therefore requiring no new infrastructure. Rather than viewing a status bar at the bottom of their television screens and making selections with a remote control, participants will log on to the Internet from their personal computers and access the utility's Web site, using a special personal identification number to call up their own energy information. Ultimately, they may even be able to pay their bills on-line. "We're moving away from television because it tied us to broadband networks," says Laurie Schneemann, the utility's manager for the project, referring to networks (such as those using coaxial cable or fiber-optic lines) capable of delivering video images. "In

the new phase of the project, we are not creating a network at all," she says. "We already have a network--it's called the Internet." Schneemann admits that the line between computer and television is blurring, however, noting that "four to five years from now you might not be able to tell much difference between your television and a PC."

A box is a box?

This fusion of television and computer is already beginning to occur in the consumer market--a phenomenon fueled by the burgeoning popularity of the Internet and by the high cost of PCs. In fact, although talk about home PCs is pervasive, the personal computer has still made it into only 30% of U.S. homes, and many of these models are not capable of browsing the Internet at an acceptable speed. And at a cost of more than \$1500 for a device that includes capabilities that aren't necessarily desirable to consumers, the PC admittedly isn't doing a great job of bringing the Internet to the general public. (See the sidebar for information on the future of the Internet.) So in its place, some innovative electronic products are beginning to crop up.

Just this fall Sony and Philips released set-top boxes--built by a new company called WebTV--that enable consumers to access the Internet through their television sets. These set-top devices connect to television sets much as VCRs do, and they include receptacles for a telephone line, over which Internet data can flow, and for coaxial cable, as an option for those who prefer faster access to the World Wide Web. All the necessary software to hook up to and browse the Internet is built in. If consumers have the picture-in-picture feature on their television sets, they can read their e-mail or search the Web without missing any action. There's also a credit card slot for on-line purchases. Both versions of the WebTV sell for a little over \$300. Each system includes an on-screen keyboard; there is an optional wireless keyboard for an additional \$75.

Other forms of relatively cheap access to the Internet are coming soon. Among those in the works is the network computer (NC), a prototype of which was demonstrated by Oracle last February. Like the WebTV products being marketed by Philips and Sony, the NC does not rely on software disks. Rather, it includes a simple operating system and can retrieve any necessary applications from the Internet. In fact, the NC, which is expected to be available early this year and to sell for about \$300, is in direct competition with the WebTV devices, not to mention the PC. Oracle's CEO, Larry Ellison, predicts that network computers will outsell PCs by the end of the decade.

EPRI views the network computer as an ideal vehicle for bringing the electric utility inside the home and has established a formal alliance with Oracle to ensure that the device incorporates capabilities for energy management, home and business automation, and security. "This extended network computer would have a built-in capability for communicating with electric utilities and would be able to deliver a suite of energy products and services over the Internet," says EPRI's Cain, who is managing relations with Oracle. "Users could consult it to retrieve information and carry out transactions not only on their electricity use but also on water and natural gas. It will also have energy management features similar to those offered by the Raytheon unit used by CSW Communications in Laredo."

On-line

Already, electric utilities are tapping the Internet to reach their customers. As of the beginning of this year, 180 utilities have home pages on the World Wide Web. Generally, though, utilities are using the Internet mainly for one-way communications--relaying background information on their companies and news about special customer programs--and have not deployed it for sophisticated energy management services. That is starting to change, however, as PG&E's efforts indicate.

Among the other utilities taking a more interactive approach to the Internet is San Diego Gas & Electric. From the company's home page, customers can enter the Virtual Reality Greenhouse, an image of a family room in which they can click on overhead lights, a stereo, and other energy users to find out how much electricity these devices consume. And last August, with some funding from the U.S. Department of Energy and EPRI, Enova Technologies (a sister company of SDG&E) teamed up with Pacific Bell to develop a user-friendly Internet-based energy management system that is expected to be ready for implementation this spring. "We're trying to distinguish ourselves from other potential service providers," explains Tiff Nelson, the utility's manager for the project.

As is the case with PG&E's project, about 50 SDG&E customers will be selected for participation and will be able to monitor and control their electricity use from their home PCs. Plans are for SDG&E's system to provide users a comparison of the current month's energy consumption with that of the previous month and with that of the same month the previous year. Although time-of-use rates are not expected to be in place, users will be able to control a few large appliances, and a simulated time-of-use program will allow them to determine how much money they could save if such rates were implemented. Plans are for the program to last nine months. This project is among the first efforts to apply EPRI's Customer System 2000, which is aimed at helping utilities upgrade their Web sites from browsing facilities into virtual business environments capable of supporting a variety of interactive services.

Amid all the activity involving sophisticated, user-friendly customer interfaces, some utilities are taking a different, more immediate, and far less expensive approach. Kansas City Power & Light, for instance, has opted for a wireless, cellular-based communications system. For an operational cost equal to that of manual meter reading, KCP&L is deploying a system that, by the close of 1996, was already tied in to all 420,000 residential and small commercial customers in the utility's major metropolitan area. CellNet Data Systems installed the system at no cost to KCP&L, "assuming all the risk," notes Doug Morgan, vice president of information technology for the utility. KCP&L pays a transaction fee every time data travel across the system, and the cumulative costs equal the expense of manual meter reading.

The system provides the basic benefits of the more-sophisticated hybrid fiber-coax approach, including remote meter reading, outage notification, and meter-tampering detection. But the system does not provide capacity for more-advanced services in the future, such as Internet access, electronic mail, and interactive television.

"We decided on a narrowband approach because we believe that competition and retail wheeling are going to happen soon, and we want to position ourselves for that market," says Morgan. "If we waited for broadband technology to become economical enough to be deployed throughout our service territory and to get integrated, we'd be sitting around for years." By getting its system in place now, KCP&L is gaining experience in using the electricity consumption information that's relayed to it every 5 minutes from each meter. These data are fed into computer models that estimate how much electricity specific appliances in the home are using. In a competitive environment, the marketing value of such detailed customer information is crucial, says Morgan. And because the wireless system is so economical, KCP&L can deploy the capability throughout its service territory. Early this year the utility plans to roll the service out to its large commercial and industrial sites.

Home, sweet home

Why are electric utilities focusing so heavily on the residential market? After all, the large commercial and industrial accounts are the ones at highest risk for being snatched up by competitors, as some utilities have already experienced. And with such significant electricity consumption at a single site, a utility can

justify the often large monetary investments that their telecommunications endeavors require. Indeed, many electric utilities have already made such investments for their large customers, laying fiber-optic lines and installing sophisticated energy management systems in their plants. These customers have enjoyed the benefits of time-of-use pricing for years, and some of them now even have real-time pricing, through which rates vary hourly.

And therein lies the rationale for utilities to pursue the common person. The way some power companies see it, the residential arena is a market waiting to be had. After all, dollars from the residential sector make up about 35% of the utility industry's revenues. "There are already quite a few technologies out there for large industrial and commercial customers," says Tom Wick, manager of distribution and customer systems integration for Wisconsin Electric Power Company, a subsidiary of Wisconsin Energy Corporation, which teamed up with the Baby Bell Ameritech Corporation last year to establish a company, Energy Connections, to market utility automation and other advanced home services. The new company's product is a modular, turnkey system with capabilities ranging from remote meter reading to power quality monitoring to security. The system, which has been tested in 30 homes in Wisconsin Electric's service territory and is now undergoing deployment in 170 additional homes for further testing, is designed to work with a variety of infrastructure technologies, including paging and telephone line, and will be marketed to electric utilities for use with residential and small commercial and industrial customers. The tests under way involve the use of two different thermostat-like customer interfaces. The more sophisticated of the two, called the Enhanced Customer Interface, includes a display for text messages.

Some utilities emphasize that they are trying to get a better handle on the residential market to determine which energy management services are even of interest to this customer segment. "We're pretty clear on the needs of our large commercial and industrial customers, but the residential customers have always been grouped together as a single customer," says Jim Gariepy, who is managing Detroit Edison's Intelligent Link project. Since last April, the utility has been testing an energy management system with a small group of customers to see how they respond to capabilities like appliance control and time-of-use pricing. If all goes well, the system will be rolled out to serve the remainder of Detroit Edison's 1.9 million residential customers. As in the Energy Connections system, the customer interface is a thermostat (in this case, one manufactured by Honeywell) that includes a display for billing information, public service announcements, and rate information.

In a separate effort underscoring its interest in the residential market, Detroit Edison has invested \$10 million in Echelon Corporation of Palo Alto, California, the company that developed a communications protocol and special electronic chips that enable devices like the Honeywell thermostat to communicate over standard house wiring.

Big numbers

The sheer volume offered by the residential market also makes it worth pursuing. Rather than having to customize a system for every user, as is typically the case with commercial and industrial customers, utilities can rely on mass-produced systems that they can deploy throughout their service territories. "The more systems or components that are sold, the more the cost of the products comes down," explains Dennis Ragone, a project manager for two-way customer communications at Public Service Electric and Gas.

PSE&G has partnered with Lucent Technologies to develop a two-way communications system that will be marketed to electric and gas utilities. Ragone emphasizes that the system was developed to serve all market segments--residential, commercial, and industrial. "We wanted a system that's inexpensive enough

to be deployed everywhere," he says. "This system provides a way for utilities to cut their costs and to gear up for future business opportunities." The Lucent system relies on a hybrid fiber-coax infrastructure and could employ a variety of customer interfaces, from screen telephones to personal computers. During the trial run in PSE&G's service territory, however, the interface is a Honeywell thermostat.

A pilot system has been deployed to 930 residential, 65 commercial, and 5 industrial customers. After thorough testing and evaluation, PSE&G plans to roll the system out to 500,000 of its customers by 2002. But don't large commercial and industrial customers already have these capabilities in place? According to Ragone, PSE&G does provide load-profile metering to most of its large commercial and industrial customers. The Lucent system would enable additional capabilities like real-time pricing and load control, however—at costs well below those of the existing system.

In at least one area of the country, a portion of the residential segment—luxury multifamily housing—is already embroiled in the battle for power supply. With their health clubs, street lighting, communal trash compactor systems, and other electricity consumers, such communities can constitute a demand of more than 10 MW. In Georgia, the turf wars over providing power to luxury apartment complexes have become more aggressive in the last two years, with an array of investor-owned utilities, municipalities, rural electric cooperatives, and others all competing for the same customers. Because the apartment developers have their pick of electricity suppliers, power providers are eager to look better than their competitors.

The Southern Company, the parent company of Georgia Power, is implementing a clever business line that exploits a wide range of telecommunications technologies. Under its Premier Home label, the utility plans not only to provide sophisticated energy management services to luxury apartment dwellers but also to consolidate all utility-related charges on one bill. That includes phone service, cable television, security, Internet access, water use, and more. The plan is being piloted at a 303-unit apartment complex in Duluth, an Atlanta suburb, in cooperation with Dominion Companies, a national developer of luxury apartment homes.

Bill Kirby, director of new ventures at Southern Development & Investment Group, the Southern Company subsidiary heading up this effort, says the software and systems that provide the consolidated billing and energy management services can now be used for similar projects. Kirby says he's gotten phone calls from developers "in every corner of the country" ever since the first residents moved into the complex, called Chatelaine Park, late in January of last year. The developers are all interested for the same reason, Kirby says: the advanced services and billing conveniences make their apartments more attractive than others. The Premier Home concept is undergoing a two-year trial, and if it is successful, Southern Development could deploy it in virtually any area of the country where demand exists. And indications are that there are more such projects to come. In November, Southern Energy (an unregulated subsidiary of the Southern Company) and Dominion signed a long-term agreement for the utility to act as the developer's energy provider and rate consultant. A separate agreement that allows Southern to coordinate services similar to Chatelaine's at other Dominion communities is being negotiated. Currently, the developer has 16 apartment communities complete or in development, 12 of which are in the Southern Company's service territory.

Kirby is among those who believe home automation is the wave of the future. Customers, he says, are coming to expect such advanced services. "Like putting airbags in cars, this is going to become a cost of doing business," he says. That might be debatable. But a recent EPRI survey of 30,000 electric utility customers, selected to be a representative slice of U.S. consumers, indicates a significant interest in energy management.

According to this survey, published late last year, 45% of respondents expressed interest in services to monitor home energy use, with 17% of the 30,000 indicating they are "very interested." Other potential market areas include whole-house surge suppressors, which drew interest from 39% of the survey respondents, and home security, which received interest from 33%. (More-detailed results from the survey are available through an EPRI report called *ReQuest III*, TR-107631.) While these results are promising, they are certainly not a guarantee that these services will be a hot commodity among consumers. And it's hard to tell whether the currently disinterested consumers can be won over. In the words of Rich Gillman, EPRI's manager of market and load research, who oversaw the survey, "It's not going to be an easy sell."

But is it possible that many consumers simply don't know what they are missing? Perhaps once they are used to the convenience and savings of energy management services, they'll begin to seek these services out. If Rene Rodriguez of Laredo, Texas, is any indication, there might be some merit to that thought. "I was the last one of my neighbors to jump on board," he says. "Now I'm trying to sell the program to everyone I know!"

Sidebar:

A Future Vision

Background information for this article was provided by Steve Drenker and David Cain of the Customer Systems Group.

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Underground Transmission

Recent Publications

PDF Business Area Target

DOCUMENT	IN-103141
TITLE	<i>New Underground Construction Technologies Help Georgia Power Inexpensively Accomplish A Seemingly Impossible Project</i>
DETAILS	Innovators
UTILITY	Georgia Power Company

PROJECT	RP7922
PROJMGR	Tom Rodenbaugh
BUS_GROUP	Business Group : Power Delivery Group PF Business Unit : Transmission EPRI Working Unit: Transmission

SUBJECT	D3005 Distribution O & M T3003 Underground Construction, O & M T3004 Underground System Alternatives U3005 Planning Capabilities
KEYWORDS	Underground Distribution Underground Transmission Distribution Cables Transmission Cables Construction Costs Cable Pullers
TARGET	T3002 Underground Transmission

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BENEFITS

o Using EPRI's new underground construction technologies, Georgia Power Company quickly completed in 1993 a line relocation project that had been stalled for four year. In this application, new horizontal boring techniques saved the utility \$475,000; equivalent savings are expected from similar future applications.

o Because the 1993 project involved installing a power line under a river, Georgia Power also gained know-how applicable to running power lines below harbors and wetlands.

CHALLENGE

Electric utilities today generally use "cut-and-fill" construction to install underground transmission and distribution cables. These open-trench techniques are expensive, time-consuming, and environmentally unappealing. Georgia Power Company's service territory includes the Nacoochee Valley, and environmentally sensitive region in northern Georgia. The valley is host to a Native American ceremonial site, and the valley floor is crossed by the Chatahoochee River. In the late 1980s, Georgia Power attempted to move an existing overhead 115-kV circuit power line underground in the valley. Concerns about the potential impact of traditional construction methods on the site, however, stalled progress for four years. Hoping to resolve the problem quickly, Georgia Power turned to EPRI for assistance.

RESPONSE

Recent EPRI research had developed applicable new underground construction technologies. For example, a new mid-size horizontal drilling rig was available that could drill to 1200 feet and pull in pipes up to 18 inches in diameter. Previous technologies could not economically drill at such lengths or provide the power to pull in the ducts required to install transmission-class cables. A new EPRI AccuNav(TM) underground boring guidance system would also allow operators to control drill head location at increased depth and with improved accuracy. Moreover, specialized boring bits and ground-penetrating radar to locate underground utility lines or historical artifacts were under development.

A team of experts working under EPRI guidance applied these techniques to install the 115-kV cable in just eight weeks. The project called for placing a 2400-foot long, 10-inch conduit under the valley floor, beneath the Chatahoochee River, and running it up the valley walls. Accomplishing the work required meeting an unusual number of challenges: rock, cobble, clay, flowing sand, the river, a state highway, and very steep hillsides. Yet drill operators were able to bore under the valley floor without disrupting historical artifacts or burial sites, efficiently drilling a 16-inch diameter hole through hard river cobble and solid quartz rock. Cable pulling activities also pioneered several new techniques: use of cable pushers with pulling winches; a newly designed pulling rope that injects a lubricant at the pulling eye; and complete instrumentation of the cable pulling head, winch, pushers, and reels to allow instantaneous control. As a result, workers successfully pulled XLPE transmission cables the entire length of the run without joints.

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Progressive Flexibility '97[Table of Contents](#)[Power Delivery](#)**Transmissions & Substations****Underground Transmission****Target Audiences**

Utility officers, senior managers, and staff responsible for:

- Maintaining/improving underground transmission reliability
- Operation, inspection and maintenance of underground transmission
- Maximizing power flow for underground transmission
- Upgrading and uprating of existing underground lines
- Design and analysis of new underground lines
- Right-of-way management for underground lines

Background

Shifting regulations, wholesale wheeling, and growing electricity markets are dramatically increasing the value of transmission assets to utilities. At the same time, overhead transmission lines are becoming increasingly unacceptable in populated areas-and thus costly to install and operate. Underground transmission provides an alternative that has been used for decades to supply critical downtown loads in large cities. However, many utilities still view underground transmission as a last resort.

The Underground Transmission Target provides members with advanced technologies and tools that increase the cost-effectiveness of underground transmission for existing cables as well as for new construction. As an example, on-line monitoring and rating systems of underground lines are being devised that will increase ampacity of installed circuits by 10%. In 1997, on-going and new projects will address improvements for members in both the existing underground assets and in the area of new construction.

Maximum Utilization of Installed Cables

For existing underground transmission systems, the primary objective of utilities is to maximize circuit life and operational performance. What makes matters difficult is that many installed systems are approaching, or exceeding, their design lives. Of course this is happening in a time period where utilities have had to drastically reduce their budget for engineering staff and for field maintenance.

This Underground Transmission Target is developing a family of advanced diagnostic practices, life evaluation procedures, and on-line monitoring tools that meet the competitive challenges of the transmission industry. For 1997, ongoing efforts are complemented by new work such as application of EPRI reliability centered maintenance concepts to underground cables. Products and tools will provide up to 20% savings in underground maintenance costs while increasing reliability and enhancing performance.

New Cables and Installation Methods

High installation costs and environmental risk of dielectric fluid leaks hinder application of underground transmission systems. To address these issues, the Underground Transmission Target is developing and demonstrating precision-guided boring technologies, as well as fluid-free cross-linked polyethylene (XLPE) cables. These new technologies can be used for new underground lines, or they can be used to retrofit existing pipe-type systems. It should be noted that the expected benefit of the new guided boring technology is a 20% reduction in installation costs. In 1997, emphasis is being placed on developing and deploying a family of diagnostic tools that will reduce the number of failures in XLPE cable systems.

In Summary

The Underground Transmission Target offers members existing, on-going, and new products that:

- Enhance the economic and environmental attractiveness
- Lower operation and maintenance costs
- Lower design, capital and construction costs (for new and for retrofits)
- Increase underground line carrying capacity
- Improve underground line reliability

Product Listing

The order of the product list below is based on the most recent ranking obtained from our utility advisors. The target is priced to result in probable 1997 funding for the products listed. The budget column reflects 1997 dollars for the EPRI Base R&D program. It should be noted that members who fund this Target will obtain the results of the Tailored Collaboration projects also shown below.

Products by Priority (Base Program)	Initial Deliverable Date
1 <u>Assurance Testing and Diagnostics for XLPE Cable Systems</u>	1997
2 <u>Underground Transmission Installation Cost Reduction</u>	1997
3 <u>New Extrudable Dielectrics</u>	1998
4 <u>Dissolved Gas Analysis Interpretation Guide</u>	1997
5 <u>Reliability Centered Maintenance for Underground Transmission</u>	1997
6 <u>Pipe-Type Cable Life Evaluation Procedures</u>	1998
7 <u>Distributed Fiber Optic Sensor Systems</u>	1997
8 <u>Superconducting Cable Application Studies</u>	1998

The results from these projects, which augment the base funded portfolio, are made available to all target members. TC funds from utility members are matched by EPRI dollars.

TC1 <u>345kV XLPE Cable Retrofit for Pipe-Type Cable Systems</u>	1998
TC2 <u>Expanded Underground Transmission Workstation</u>	1997

The results from Strategic R&D projects are made available to all EPRI funders. These projects perform fundamental research in key strategic areas that have high potential payoff. By their very nature, these projects have a long-term time horizon and produce results that are used by advisors and EPRI staff to define future projects to be funded by the base R&D budget.

SRD1 Superconducting Cable System Development 1998

Contact: Don Von Dollen, (415) 855-2679

Additional Information: Lora Cocco, (415) 855-2620

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THIS IS THE FULL TEXT

BODY:

JEFF GRIFFIN

The completion of the underground installation of 30,000 feet of fiber optic telephone cable in South Texas provides another solid example of the advantages trenchless technology techniques provide for underground utility construction.

Cannon Construction Inc., Brookhaven, MI, was primary contractor for the AT&T project. The cable is part of a long-distance telephone toll line between Corpus Christi and Harlingen, TX.

Trenchless techniques are becoming the method of choice for an increasing number of projects in urban areas where most or all the area is paved, vehicular traffic heavy, and easements already contain a conglomeration of buried communications and electric cable, natural gas lines and water and sewer pipe.

Charlie Smith, Cannon vice president, said directional boring was chosen as the best method for this job because of congested conditions along much of the cable route and requirements of the city. Work began in downtown Corpus Christi where right of way was covered with paved streets and sidewalks. Boring did not disrupt traffic or other daily activities.

Length of bores ranged from 300 to 900 feet. Average depth was six feet. After each bore, four-inch high-density polyethylene pipe was pulled back through the hole. The fiber optic cable then was pulled through the pipe and connections made.

'The city,' says Smith, 'wasn't really familiar with trenchless technology. At first, city officials were very concerned about existing utilities, impact of traffic flow and so forth. Once we were

under way, they saw that trenchless technology has a huge benefit, allowing work to progress in the inner city without inconvenient and time-consuming trenching and costly restoration and clean up requirements.'

Smith says soil conditions initially caused problems. 'The downtown area of Corpus Christi is pure sand,' he said. The loose sand collapsed around the drill pipe, restricting production.